

Serial No. 10/708,926
Am't Dated October 15, 2008
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Listing of Claims:

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1.-9. (Cancelled)

10. (Currently amended) A resistivity logging tool, comprising:

a propagation or induction resistivity antenna disposed on an elongated tubular having a longitudinal axis and adapted for subsurface disposal;

a recess in an outer wall of the tubular and extending circumferentially about the longitudinal axis of the tubular, wherein the recess recedes from a first edge at the outer wall of the tubular and from a second edge at the outer wall of the tubular, the first edge being spaced longitudinally across the recess from the second edge;

a lateral resistivity sensor disposed in [[a] the recess in the elongated tubular;

a shield disposed on and about the outer wall of the tubular and extending across the recess to cover the recess and the lateral resistivity sensor; and

an insulating mechanism including a circumferential gap, the circumferential gap being located separately from the recess and extending continuously about the tubular to prevent electric current flow in the shield in a direction parallel to the longitudinal axis of the tubular near the lateral resistivity sensor.

11. (Original) The resistivity logging tool of claim 10, wherein the lateral resistivity sensor comprises a toroid.

12. (Original) The resistivity logging tool of claim 10, further comprising an electrode disposed on the tubular, the electrode selected from one of a ring electrode, a button electrode, and a combination thereof.

13. (Original) The resistivity logging tool of claim 10, wherein the lateral resistivity sensor comprises: an insulating base layer disposed in the recess in the tubular; and a toroidal antenna disposed over the insulating base layer.

14. (Original) The resistivity logging tool of claim 13, wherein the toroidal antenna comprises a conductive wire disposed over the insulating layer.

Serial No. 10/708,926
Amdt Dated October 15, 2008
Non-Final Office Action mailed June 16, 2008

15. (Original) The resistivity logging tool of claim 13, wherein the toroidal antenna comprises a toroidal core formed from one of a magnetically permeable material wrapped in the tubular recess or a ferrite material disposed in the recess.

16. (Original) The resistivity logging tool of claim 10, wherein the lateral resistivity sensor includes a pressure compensating mechanism.

17. (Previously presented) The resistivity logging tool of claim 10, wherein the circumferential gap is a continuously extending gap incorporated in the shield.

18. (Previously presented) The resistivity logging tool of claim 17, wherein the circumferential gap is filled with an insulating material.

19. (Currently amended) The resistivity logging tool of claim 10, wherein the circumferential gap is incorporated in the tubular away from the recess and includes an electrically insulating material disposed between a junction formed between the shield and the tubular.

20. (Original) The resistivity logging tool of claim 10, wherein a section of the shield positioned over the induction or propagation resistivity antenna comprises at least one slot filled with an insulating material.

21. (Original) The resistivity logging tool of claim 10, wherein said recess contains both the induction or propagation resistivity antenna and the lateral resistivity sensor.

22. (Original) The resistivity logging tool of claim 10, wherein the tubular is a drill collar.

23.-34. (Canceled)

35. (Currently amended) A method for building a resistivity tool using an elongated tubular having a longitudinal axis and adapted for disposal within a subsurface formation, comprising:

disposing a lateral resistivity sensor in a recess in the tubular;
disposing an induction or propagation resistivity antenna on the tubular, wherein the recess is in an outer wall of the tubular and extends circumferentially about the longitudinal axis

Serial No. 10/708,926
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of the tubular, wherein the recess recedes from a first edge at the outer wall of the tubular and from a second edge at the outer wall of the tubular, the first edge being spaced longitudinally across the recess from the second edge;

positioning a shield assembly on and about the outer wall of the tubular and extending across the recess to cover the recess and the lateral resistivity sensor; and

extending a circumferential gap continuously about the tubular and separately from the recess, and electrically between the shield assembly and the tubular, thereby preventing electric current to flow along the shield in a direction parallel to the longitudinal axis of the tubular near the lateral resistivity sensor.

36. (Original) The method of claim 35, wherein disposing the lateral resistivity sensor comprises: disposing a base layer of an insulating material in the recess in the tubular, and assembling a toroidal antenna comprising a toroidal core and a conductive wire wound around the toroidal core, wherein the toroidal core comprises a magnetically permeable material wrapped around the insulating base layer.

37. (Previously presented) The method of claim 35, further comprising adapting the recess in the tubular with a pressure compensating mechanism.

38. (Canceled)

39. (Previously presented) The method of claim 35, wherein the circumferential gap is incorporated in the shield assembly and is filled with an insulating material.

40. (Original) The method of claim 35, further comprising disposing an electrically insulating material between a junction formed between the shield and the tubular.

41. (Previously presented) The resistivity logging tool of claim 10, wherein the circumferential gap is incorporated into the tubular and positioned between the shield and the tubular.